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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,049	GANZ ET AL.	
	Examiner	Art Unit	
	Elizabeth Royston	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 October 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5-18, 20, 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5-18, 20, 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment to claims 5 and 15 in the reply filed on 10/26/2009 is acknowledged.

2. Claims 5-18 and 20-21 as filed by Applicant on 10/26/2009 are pending in the instant Official action.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 5-7, 9-13, 17, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Kyoto (US PN 4664690) and Bartsch (DE 10332176 B4), US 2004/0129026 used for translation.

With regard to claims 5-7, Gänsicke teaches a method for producing a tube of synthetic silica glass in a vertical drawing method comprising continuously supplying a silica glass mass to a heating zone and softening the glass mass therein (col. 3, line 41-43), drawing a tube strand continuously off from a softened region of the silica glass mass (figure 1, item 18), the tube having an inner bore with a scavenging gas circulated through it (col. 3, line 35-40, 53-56), and obtaining a silica glass tube by cutting said tube strand to length (col. 4, line 47-48), where the front end of the tube strand distal to the softened region (figure 2, item 13) is closed by a flow obstacle (figure 2, item 20).

Gänsicke does not explicitly disclose a flow obstacle which is permeable to the scavenging gas and which reduces the flow of the scavenging gas though the inner bore or a scavenging gas with a water content of less than 30 wtppb.

Bartsch teaches a flow obstacle formed by a plug which projects into the inner bore of the tube strand (figure 2, item 5) at the end of the tube strand which is permeable to and reduces the flow of the scavenging gas through the inner bore (figure 2, item 2, 4a/b, 5; paragraph 23, line 5-8) by narrowing the cross section of flow of the gas (paragraph 24).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the flow obstacle taught by Bartsch as the flow obstacle in the method taught by Gänsicke. The rationale to do so is provided by the motivation in the teaching of Bartsch, that to include the hole in the flow obstacle predictably allows for the increased internal pressure of the tube to maintain tube shape as desired by both

Gänsicke and Bartsch, while preventing a too high overpressure from building up and damaging the glass tube (paragraph 31, line 13-17).

Kyoto teaches a method of dehydrogenating an optical glass preform using a substantially similar process with substantially similar materials in terms of the scavenging gas (col. 4, line 60), temperature (col. 5, line 65), flow (col. 5, line 63), and timing (col. 5, line 66) as claimed by applicant. Kyoto further teaches the scavenging gas to be "pure" (col. 3, line 24). Although Kyoto does not explicitly state the water content of the scavenging gas to be less than 30 wtppb, since the final OH concentration in the product taught by Kyoto (col. 6, line 14) is the same as the final OH concentration in the product produced by Applicant (less than 0.1 ppm), the water concentration in the gas as taught by Kyoto would intrinsically have had to have been within the range claimed by Applicant in order to be able to produce the final OH concentration claimed by Applicant.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the materials and conditions taught by Kyoto in the method taught by Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the scavenging gas at the taught conditions predictably reduces the OH concentration of the glass preform thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 9, Gänsicke teaches a silica glass mass provided in the form of a hollow cylinder which is continuously fed to a heating zone and softened in portions

(col.3, line 41-43; figure 1, item 1 and 5), with the tube strand continuously drawn off from the softened region (figure 1, item 18) to at least 5 times its initial length (calculated from the diameters of the pre and post drawn tubes in example 1).

With regard to claim 10, although Gänsicke in view of Bartsch and Kyoto does not explicitly disclose drawing the glass to at least 20 times the initial length, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the volume/mass of the initial silica mass and the diameters of the inner and outer walls of the drawn tube such that the draw length was 20 times the initial length, if such a length was desired.

With regard to claims 11 and 20, Kyoto teaches a scavenging gas with a chlorine gaseous drying agent (col. 4, line 61-63; example 1; table 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use chlorine gaseous drying agent taught by Kyoto in the method taught by Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the chlorine dehydrating agent predictably reduces the OH concentration of the glass preform thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 12, although Gänsicke in view of Bartsch and Kyoto does not explicitly disclose the scavenging gas being subjected to a drying process prior to

introduction to the inner bore of the tube strand, given that the scavenging gas is used as a drying (dehydrating) gas (Kyoto, col. 4, line 59), it would have been obvious to one of ordinary skill in the art to use a drying gas that doesn't already contain the contaminant that the gas is designed to remove from the glass, and to thus take steps to ensure the drying gas is initially contaminant free.

With regard to claim 13, Kyoto teaches a volume flow of scavenging gas not exceeding 80 l/min (example 1, table 2, flow rate of gas; example 2, col. 6, line 46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the flow rate taught by Kyoto in the method taught by Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the flow rates taught by Kyoto predictably reduces the OH concentration of the glass perform, thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 17, Kyoto teaches the silica glass tube is subjected to an OH reduction treatment at a temperature of at least 900°C (col. 5, line 62-66). Although Kyoto does not explicitly disclose the atmosphere as being water free, Kyoto does not teach water as part of the dehydrating gas. Furthermore, since the purpose of the environment is to remove water from the glass, it would have been obvious to one of ordinary skill in the art to start with an environment free of the water contaminant so as to maximize the environment's efficacy at water removal from the glass.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the OH reduction treatment and temperature taught by Kyoto in the method taught by Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use a temperature of at least 900°C predictably reduces the OH concentration of the glass perform (col. 4, line 64-65), thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 21, Gänsicke teaches the drawn tube as a substrate in the MCVD method (col. 3, line 22) for making high-purity glass quartz glass (col. 3, line 18).

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Bartsch (DE 10332176 B4), US 2004/0129026 used for translation, and Kyoto (US PN 4664690), as applied for claims 5 and 6 above, and in further view of Lebert (US PN 4165223).

With regard to claim 8, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose a gas flow obstacle.

Lebert teaches a gas flow obstacle (col. 3, line 53).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the gas flow obstacle taught by Lebert as the plug in the method taught by Gänsicke in view of Bartsch and Kyoto. The rationale to do so is provided by the motivation found in the teaching of Lebert, that to use a gas flow obstacle predictably

allows for an increased pressure of the pipe interior (col. 1, line 58-61) resulting in the formation of pipes with a minimum of deviations in the diameter (col. 1, lin3 35-38).

7. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Bartsch (DE 10332176 B4), US 2004/0129026 used for translation, and Kyoto (US PN 4664690), as applied for claims 5 and 6 above, and in further view of Powers (US PN 4165223).

With regard to claims 14 and 15, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose an external scavenging gas flowing around the outer cladding of the tube strand in the region of the heating zone with the external scavenging gas having a water content a factor of 10 greater than the water content of the internal scavenging gas, and where the same gas is used for both the internal and external scavenging gas.

Powers teaches an external scavenging gas flowing around the outer cladding of the tube strand in the region of the heating zone, where the same gas, and thus resulting gas composition, is used for both the internal and external scavenging gases (col. 6, line 27-29; figure 5, item 82, arrows representing the same gas flowing from the inner channel, coming out from bottom of tubular perform and through the perform walls). Although Powers does not explicitly teach a water content of the external scavenging gas a factor of 10 greater than the internal scavenging gas, it would have been obvious to one of ordinary skill in the art at the time of the invention that the internal scavenging gas, after removing the water contaminant from the inner channel

portion of the glass tube preform, would contain the removed water as it passed the external surface of the preform.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the same gas for the external and internal scavenging gas as taught by Powers, with the dehydrating process taught by Gänsicke in view of Bartsch and Kyoto. The rationale to do so is provided by the motivation in the teaching of Powers, that drying the preform using this method predictably results in a reduction in the profile distortion of the index of refraction of the optical fiber (col. 11, 20-25).

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Bartsch (DE 10332176 B4), US 2004/0129026 used for translation, Kyoto (US PN 4664690), and Powers (US PN 4165223), as applied for claims 5 and 14 above, and in further view of DeLuca (US PN 3933454).

With regard to claim 16, Gänsicke in view of Bartsch, Kyoto, and Powers does not explicitly disclose the external scavenging gas flowing around the outer cladding of the tube strand while the strand is cooled to a temperature below 900°C. Although Powers teaches the scavenging gas flow continues through the initial dehydration and consolidation phases (col. 8, line 25-34; col. 13, line 45), Powers does not make any mention of the gas flow, whether present or absent, with regard to the cooling step (col. 13, line 46-47).

DeLuca teaches the external scavenging gas flowing around the outer surface of the preform while the preform is cooled to a temperature below 900°C after the consolidation process (col. 9, line 37-38, 55-59; col. 10, line 17-20; figure 4, item A-D, and 74).

It would have been obvious to one of ordinary skill in the art at the time of the invention to flow the scavenging gas at the temperatures taught by DeLuca in the method taught by Gänsicke in view of Bartsch, Kyoto, and Powers. The rationale to do so is found in the motivation provided by the teaching of DeLuca, that to provide the scavenging gas as the temperature is lowered below 900°C predictably results in a slight annealing of the dense glass body with low water content (col. 10, line 17-20, 25-27).

9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Bartsch (DE 10332176 B4), US 2004/0129026 used for translation, and Kyoto (US PN 4664690), as applied to claims 5 and 17 above, and in further view of Freund (US PN 4685945).

With regard to claim 18, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose an OH reduction treatment with a deuterium-containing atmosphere.

Freund teaches OH reduction treatment with a deuterium-containing atmosphere.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a deuterium-containing atmosphere to dehydrate the glass in the method taught by Gänsicke in view of Bartsch and Kyoto. The rationale to do so is

provided by the motivation found in the teaching of Freund, that to use a deuterium-containing atmosphere predictably avoids the formation of additional OH in the glass over time (col. 3, line 17-24).

10. Claims 5-7, 9-13, 17, 20, and 21 are in the alternative rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Kyoto (US PN 4664690), Karbassiyoon (US PN 4632684), and Achener (US PN 3907536).

With regard to claims 5-7, Gänsicke teaches a method for producing a tube of synthetic silica glass in a vertical drawing method comprising continuously supplying a silica glass mass to a heating zone and softening the glass mass therein (col. 3, line 41-43), drawing a tube strand continuously off from a softened region of the silica glass mass (figure 1, item 18), the tube having an inner bore with a scavenging gas circulated through it (col. 3, line 35-40, 53-56), and obtaining a silica glass tube by cutting said tube strand to length (col. 4, line 47-48), where the front end of the tube strand distal to the softened region (figure 2, item 13) is closed by a flow obstacle (figure 2, item 20).

Gänsicke does not explicitly disclose a flow obstacle which is permeable to the scavenging gas and which reduces the flow of the scavenging gas though the inner bore or a scavenging gas with a water content of less than 30 wtppb.

Karbassiyoon teaches heating a glass preform with a continuous flow of gas through the center (figure 1, item 2) held at a controlled super atmospheric pressure (col. 3, line 27-29) with a flow obstacle formed by a plug that narrows the cross section

of the gas flow (col. 4, line 15, item 28; col. 5, line 7-15) which is permeable to the flow and reduces the flow of the gas through the inner bore of the tube (item 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the restricted flow taught by Karbassiyoon in the method taught by Gänsicke. The rationale to do so would have been provided by the motivation found in the teaching of Karbassiyoon, that to use such a flow system predictably prevents the deterioration of the optical properties of the inner surface of the glass preform (col. 2, line 18-21).

Gänsicke in view of Karbassiyoon does not explicitly disclose the projection of the flow obstacle into the inner bore of the tube strand.

Achener teaches a flow obstacle formed by a plug which projects into the inner bore of the tube strand (figure 5, item 86, 86a) and reduces the flow of the gas through the inner bore by narrowing the cross section of flow of the gas (figure 5, item 88).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the plugs of Achener in the method taught by Gänsicke in view of Karbassiyoon. The rationale to do so would have been provided by the motivation found in the teaching of Achener, that to use such plugs to control the flow predictably results in the ability to simultaneously inflate and draw the glass tube (col. 5, line 43-44), without bulging (col. 5, line 51-55), while maintaining the desired internal pressure differential (col. 5, line 33-35).

Kyoto teaches a method of dehydrogenating an optical glass preform using a substantially similar process with substantially similar materials in terms of the

scavenging gas (col. 4, line 60), temperature (col. 5, line 65), flow (col. 5, line 63), and timing (col. 5, line 66) as claimed by applicant. Kyoto further teaches the scavenging gas to be "pure" (col. 3, line 24). Although Kyoto does not explicitly state the water content of the scavenging gas to be less than 30 wtppb, since the final OH concentration in the product taught by Kyoto (col. 6, line 14) is the same as the final OH concentration in the product produced by applicant (less than 0.1 ppm), the water concentration in the gas as taught by Kyoto would inherently have been less than 30 wtppb.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the materials and conditions taught by Kyoto in the method taught by Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the scavenging gas at the taught conditions predictably reduces the OH concentration of the glass preform thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 9, Gänsicke teaches a silica glass mass provided in the form of a hollow cylinder which is continuously fed to a heating zone and softened in portions (col.3, line 41-43; figure 1, item 1 and 5), with the tube strand continuously drawn off from the softened region (figure 1, item 18) to at least 5 times its initial length (calculated from the diameters of the pre and post drawn tubes in example 1).

With regard to claim 10, although Gänsicke in view of Karbassiyoon, Achener, and Kyoto does not explicitly disclose drawing the glass to at least 20 times the initial length, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the volume/mass of the initial silica mass and the diameters of the inner and outer walls of the drawn tube such that the draw length was 20 times the initial length, if such a length was desired.

With regard to claims 11 and 20, Kyoto teaches a scavenging gas with a chlorine gaseous drying agent (col. 4, line 61-63; example 1; table 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use chlorine gaseous drying agent taught by Kyoto in the method taught by Gänsicke in view of Karbassiyoon and Achener. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the chlorine dehydrating agent predictably reduces the OH concentration of the glass preform thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 12, although Gänsicke in view of Karbassiyoon, Achener, and Kyoto does not explicitly disclose the scavenging gas being subjected to a drying process prior to introduction to the inner bore of the tube strand, given that the scavenging gas is used as a drying (dehydrating) gas (Kyoto, col. 4, line 59), it would have been obvious to one of ordinary skill in the art to use a drying gas that doesn't

already contain the contaminant that the gas is designed to remove from the glass, and to thus take steps to ensure the drying gas is initially contaminant free.

With regard to claim 13, Kyoto teaches a volume flow of scavenging gas not exceeding 80 l/min (example 1, table 2, flow rate of gas; example 2, col. 6, line 46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the flow rate taught by Kyoto in the method taught by Gänsicke in view of Karbassiyoon and Achener. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the flow rates taught by Kyoto predictably reduces the OH concentration of the glass perform, thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 17, Kyoto teaches the silica glass tube is subjected to an OH reduction treatment at a temperature of at least 900°C (col. 5, line 62-66). Although Kyoto does not explicitly disclose the atmosphere as being water free, Kyoto does not teach water as part of the dehydrating gas. Furthermore, since the purpose of the environment is to remove water from the glass, it would have been obvious to one of ordinary skill in the art to start with an environment free of the water contaminant so as to maximize the environment's efficacy at water removal from the glass.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the OH reduction treatment and temperature taught by Kyoto in the method taught by Gänsicke in view of Karbassiyoon and Achener. The rationale to do

so is provided by the motivation found in the teaching of Kyoto, that to use a temperature of at least 900°C predictably reduces the OH concentration of the glass perform (col. 4, line 64-65), thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 21, Gänsicke teaches the drawn tube as a substrate in the MCVD method (col. 3, line 22) for making high-purity glass quartz glass (col. 3, line 18).

11. Claim 8 is rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Karbassiyoon (US PN 4632684), Achener (US PN 3907536), and Kyoto (US PN 4664690), as applied for claims 5 and 6 above, and in further view of Lebert (US PN 4165223).

With regard to claim 8, Gänsicke in view of Karbassiyoon, Achener and Kyoto does not explicitly disclose a gas flow obstacle.

Lebert teaches a gas flow obstacle (col. 3, line 53).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the gas flow obstacle taught by Lebert as the plug in the method taught by Gänsicke in view of Karbassiyoon, Achener, and Kyoto. The rationale to do so is provided by the motivation found in the teaching of Lebert, that to use a gas flow obstacle predictably allows for an increased pressure of the pipe interior (col. 1, line 58-61) resulting in the formation of pipes with a minimum of deviations in the diameter (col. 1, lin3 35-38).

12. Claims 14 and 15 are rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Karbassiyoon (US PN 4632684), Achener (US PN 3907536), and Kyoto (US PN 4664690), as applied for claims 5 and 6 above, and in further view of Powers (US PN 4165223).

With regard to claims 14 and 15, Gänsicke in view of Karbassiyoon, Achener, and Kyoto does not explicitly disclose an external scavenging gas flowing around the outer cladding of the tube strand in the region of the heating zone with the external scavenging gas having a water content a factor of 10 greater than the water content of the internal scavenging gas, and where the same gas is used for both the internal and external scavenging gas.

Powers teaches an external scavenging gas flowing around the outer cladding of the tube strand in the region of the heating zone, where the same gas, and thus resulting gas composition, is used for both the internal and external scavenging gases (col. 6, line 27-29; figure 5, item 82, arrows representing the same gas flowing from the inner channel, coming out from bottom of tubular perform and through the perform walls). Although Powers does not explicitly teach a water content of the external scavenging gas a factor of 10 greater than the internal scavenging gas, it would have been obvious to one of ordinary skill in the art at the time of the invention that the internal scavenging gas, after removing the water contaminant from the inner channel portion of the glass tube preform, would contain the removed water as it passed the

external surface of the preform, with the amount of water present in the external gas dependent on the water uptake.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the same gas for the external and internal scavenging gas as taught by Powers, with the dehydrating process taught by Gänsicke in view of Karbassiyoon, Achener, and Kyoto. The rationale to do so is provided by the motivation in the teaching of Powers, that drying the preform using this method predictably results in a reduction in the profile distortion of the index of refraction of the optical fiber (col. 11, 20-25).

13. Claim 16 is rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Karbassiyoon (US PN 4632684), Achener (US PN 3907536), Kyoto (US PN 4664690), and Powers (US PN 4165223), as applied for claims 5 and 14 above, and in further view of DeLuca (US PN 3933454).

With regard to claim 16, Gänsicke in view of Karbassiyoon, Achener, Kyoto, and Powers does not explicitly disclose the external scavenging gas flowing around the outer cladding of the tube strand while the strand is cooled to a temperature below 900°C. Although Powers teaches the scavenging gas flow continues through the initial dehydration and consolidation phases (col. 8, line 25-34; col. 13, line 45), Powers does not make any mention of the gas flow, whether present or absent, with regard to the cooling step (col. 13, line 46-47).

DeLuca teaches the external scavenging gas flowing around the outer surface of the preform while the preform is cooled to a temperature below 900°C after the consolidation process (col. 9, line 37-38, 55-59; col. 10, line 17-20; figure 4, item A-D, and 74).

It would have been obvious to one of ordinary skill in the art at the time of the invention to flow the scavenging gas at the temperatures taught by DeLuca in the method taught by Gänsicke in view of Karbassiyoon, Achener, Kyoto, and Powers. The rationale to do so is found in the motivation provided by the teaching of DeLuca, that to provide the scavenging gas as the temperature is lowered below 900°C predictably results in a slight annealing of the dense glass body with low water content (col. 10, line 17-20, 25-27).

14. Claim 18 is rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Karbassiyoon (US PN 4632684), Achener (US PN 3907536), and Kyoto (US PN 4664690), as applied for claims 5 and 17 above, and in further view of Freund (US PN 4685945).

With regard to claim 18, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose an OH reduction treatment with a deuterium-containing atmosphere.

Freund teaches OH reduction treatment with a deuterium-containing atmosphere.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a deuterium-containing atmosphere to dehydrate the glass in the method taught by Gänsicke in view of Karbassiyoon, Achener, and Kyoto. The rationale

to do so is provided by the motivation found in the teaching of Freund, that to use a deuterium-containing atmosphere predictably avoids the formation of additional OH in the glass over time (col. 3, line 17-24).

Response to Arguments

15. Applicant's arguments filed 10/26/2009 have been fully considered but they are not persuasive.

With regard to Applicant's argument that Gänsicke fails to teach a scavenging gas that circulates within the inner bore of the tube and prevents the deposition of harmful contaminants on the inner wall of the tube, the Examiner agrees. However, Gänsicke is only relied upon to teach a method of drawing a tube with a gas held within the inner bore by the presence of a flow obstruction. Under the broadest reasonable interpretation of the claim language, and in light of Bartsch that even air can remove impurities from the interior of a glass tube (abstract; paragraph 9; paragraph 20), the inert gas in the teaching of Gänsicke is interpreted as reading on a "scavenging gas". Furthermore, since the pressure of the inner bore is adjusted (col. 2, line 19-27) throughout the drawing process, the gas in the teaching of Gänsicke is interpreted as "circulating" within the inner bore. Kyoto is relied upon for teaching the specific qualities and methods of usage for a scavenging gas known in the art at the time of the invention, and Bartsch is relied upon to teach that the method of flowing air through the inner bore of a tube to prevent the deposition of contaminants along the inner wall was known.

The Examiner also agrees with the Applicant that Gänsicke teaches a negative pressure system. However, Gänsicke teaches that the pressures are adjustable. Since positive pressure systems were already well established in the art, such as in the teaching of Lebert cited on pages 7-8 of the previous Official action dated 5/21/2009, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the pressures in the system of Gänsicke for a positive pressure system if so desired.

With regard to Applicant's argument that Gänsicke fails to teach the concept of gas flow, the Examiner agrees. However, as both Bartsch and Kyoto disclose that it was well known in the art at the time of the invention to use a flowing gas to remove contaminants from heated glass products, it would have been obvious to one of ordinary skill in the art at the time of the invention to remove contaminants from the heated glass product in the teaching of Gänsicke with a flowing gas as in the teachings of Bartsch and Kyoto. Applicant has not provided a reason why it wouldn't have been obvious to use this flowing scavenging gas during the drawing step.

With regard to Applicant's argument that Bartsch fails to teach a method for drawing a tube the Examiner agrees. However, Bartsch is relied upon solely to teach that having thermally treated tubes with stoppers designed to create a pressurized interior with air flow was known. Gänsicke is relied upon to teach a method of drawing a tube with a flow obstacle present. Additionally, with regard to Applicant's argument that Bartsch fails to teach a scavenging gas, the Examiner also agrees. Although

Bartsch does teach that having the air flow through the pressurized heated glass tube results in a reduction of impurities on the surface of the glass by preventing the introduction of contaminates on the glass surface (paragraph 18), Bartsch does not explicitly disclose a scavenging gas to remove impurities from the glass surface. Kyoto is relied upon to teach a scavenging gas which removes –OH impurities from the glass surface. With regard to the Applicant's argument that Bartsch fails to teach the advantages of a continuous scavenging gas, the Examiner also agrees. Kyoto is relied upon to teach the advantages of a continuous scavenging gas. With regard to Applicant's argument that Bartsch fails to teach a flow obstacle that prevents the undue rapid loss of a gas, the Examiner respectfully disagrees. The stopper in the teaching of Bartsch is designed to control the loss of the gas such that a pressure difference in addition to a continuous flowing of air, since the air flow is required to remove any impurities from the tube interior (paragraph 20, line 5-8), representing an intrinsic functionality with regards to preventing an undue rapid loss of the gas.

With regard to Applicant's assertion that Kyoto fails to teach or suggest that the halogen gas has a low water content due to the porosity of the preform, the Examiner respectfully disagrees. Kyoto specifically teaches a halogen containing, specifically chlorine, scavenging gas (the same gas as claimed by Applicant in paragraph 35 and 36 of the Specification) and a glass product with the same or lower –OH surface content as the glass product claimed by Applicant. As cited on page 4 in lines 11-20 in the previous Official action, since the final -OH concentration on the glass in the teaching of

Kyoto is the same as or lower than the final –OH concentration as claimed by Applicant and since the type of scavenging gas, temperature, flow rate, and exposure time is the same as described by Applicant, then the water content of the scavenging gas in the teaching of Kyoto must have been within the range as claimed by Applicant in order to achieve the product as claimed by Applicant.

Furthermore, if the preform in the teaching of Kyoto is more porous than the glass surface as taught by Applicant, the preform in the teaching of Kyoto would intrinsically have a greater surface area for possible water contamination, which would require a gas with greater -OH adsorption capabilities. This implies that an even lower concentration of water in the scavenging gas in the teaching of Kyoto was required in order to achieve the product with an –OH concentration the same as or lower than that claimed by Applicant.

Finally, Applicant has not addressed the alternate rejection of claims 5-7, 9-13, 17, 20, and 21 under Gänsicke, Karbassiyoon, Achener, and Kyoto, found on pages 11-16 of the previous Official action dated 5/21/2009, nor of the alternate rejection of the additional dependent claims 8, 14-16 or 18 found on pages 16-20.

16. Applicant's arguments with respect to claim 5 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Royston whose telephone number is 571-270-7654. The examiner can normally be reached on M-Th 8:00am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ER/
Patent Examiner, GAU 1791

/Christina Johnson/
Supervisory Patent Examiner, Art Unit 1791